Symposium and Workshop
“Conservation of Historic Wrecks for Future Generations”
Hasselt University (Belgium), October 26-27, 2009

Conclusions and recommendations workshop

1 Introduction

A two day symposium and workshop under the heading “Conserving historic wrecks for future generations” was held at the Hasselt University (Belgium), October 26-27, 2009 under the patronage of Ms. Sabine Laruelle, Federal Minister of SME, Self-Employed, Agriculture and Science Policy and under the auspices of the Belgian National Committee for Antarctic Research of the Royal Academy of Belgium of Arts and Sciences. The organizing committee invited five internationally known experts representing the knowledge gained on such well known projects as the conservation of the Vasa, several Viking ships, the Mary Rose, the Batavia, etc.

The invited experts were (alphabetically):

Mr. Charles Barker  
Naval History
Director Mary Rose Archaeological Services Ltd
Mary Rose Trust - Portsmouth, United Kingdom

Dr. Inger Marie Egenberg  
Conservator
Origins and application of pine tar as preservation coating on timber structures
The Norwegian Maritime Museum - Oslo, Norway

Dr. Yvonne Fors  
Structural Chemist
Sulphur & iron-related conservation problems in marine archaeological wood
Vice-Chairman Swedish Chemical Society
Archaeological Research Laboratory, Stockholm University, Sweden

Dr. Ian MacLeod  
Corrosion chemist and materials conservator
ICOM Working group Conservation Metals
Western Australian Museum - Collections & Research Centre
Welshpool DC, Western Australia

Dr. Kristiane Straetkvern  
Conservator
Conservation techniques
Coordinator ICOM-CC Working group Wet Organic Archaeological materials
The National Museum of Denmark, The Conservation Department

---

1 Prof. dr. Jean Manca, dean Faculty of Sciences Hasselt University; Prof. dr. em. Tony Van Autenboer, SLIM vzw & Hasselt University; Dr. Rafael Kiebooms, European Patent Office Munchen; Dr. Juris Jean-Louis de Gerlache de Gomery, General advisor Ministry of Foreign Affairs; ing. Els Smeyers, Symposium and workshop Secretary Hasselt University, Dr. Wibren Oosterbaan (Hasselt University, report )
At the end of the two day convention, the five experts were asked to evaluate the findings and data on the wreck of the *Belgica*, lying at a depth of 22m and close to the coast of Bruvika near Harstad in Norway.

2 The Belgica

The experts evaluated the data on the *Belgica* which were presented by several invited speakers during the Symposium & Workshop. These included the history of the *Belgica* by Kjell Kjaer, a request for a respectful handling of the wreck by Tony Van Autenboer, the national significance and place of the *Belgica* within the family tradition by Bernard de Gerlache de Gomery, some general information of the wreck site by Walter Loy, the results of a general survey of the structure of the ship and its evolution (2006-2008) illustrated with photographs by Tomas Termote, some reflections regarding the ammunition still on board and a photographic and filmed documentation of the Belgian Navy by Guy Schotte. Finally and especially important for the potential conservation, the results of in-situ and laboratory measurements on the actual condition of the wood by Kristiane Straetkvern.

From the presentation of Kjell Kjaer it was clear that the polar career of the *Belgica* was relatively short compared to its early days of bottle-nose dolphin hunting and its later use as a cargo ship for coal and fish and finally as a storage for explosives. It was also clear that the wreck, which sunk in 1944, stripped of masts and other typical parts, does not resemble the photographs in the Antarctic and does not fit the original plans. Close to the wreck of the *Belgica*, there is a second wreck, an iron lighter also loaded with ammunition.

In-situ tests and laboratory analysis of the wood (Kristiane Straetkvern) indicated that the wood is in a very poor condition. The site characteristics with clear water, the absence of profound mud sedimentation allowing free water circulation in and around the shipwreck caused deterioration of the wood (and iron) which is in far worse condition than that of the remains of the Vasa or of the Mary Rose.

With the iron bolts weakened, the ship is rapidly falling into pieces as illustrated by Tomas Termote who surveyed the wreck site in 2006 and again in 2008. Tomas Termote also advised to remove the heavy winch on deck which threatens to crush the remaining structure. The presence of nitrates in the seawater (Walter Loy) could be further investigated to determine whether they could originate from the explosives still on board.

3 General evaluation

The experts evaluated the different options for the *Belgica* in which repeatedly reference was made to a *UNESCO Convention on the Protection of the Underwater Cultural Heritage*. Belgium and Norway should respect this convention and United Kingdom would respect it if the HMG would turn out to be the rightful owner of the wreck. This agreement implies that a plan and budgetary provisions are required before a historic wreck or parts of it can be salvaged.

---

2 The option to do nothing and forget about the wreck was not considered.
Lifting the wreck as a whole

The experts evaluated the possibility of raising, conserving and exhibiting the remains of the ship on land. It was agreed upon that this would be a theoretical possibility. The analysis of the wood however indicated a more advanced and uniform deterioration as compared to other wrecks such as the Vasa and the Mary Rose. Observations by divers on the state of decay of the iron bolts further indicated that it was unlikely that they would hold the degraded wooden structure together if the wreck is raised as a whole.

The experts all agreed that such a project has little or no likelihood of success, mainly because the hull is expected to collapse due to insufficient strength to support its own weight. Other techniques whereby the remains would be supported in a cradle or metal framework were not considered feasible.

Conservation of the wreck in a deconstruct-reconstruct operation

The experts all agreed that a piecemeal treatment in a deconstruct-reconstruct operation would be the only way for exhibiting the wreck on land. This is likely to allow the wreck to be displayed as a whole, albeit in a metal cradle as the wood lacks the necessary strength to support its own weight.

Such an operation would require a detailed 3D pre-disturbance investigation, pre-treatment on the seafloor of certain parts, identifying, labelling and cataloguing of all parts with their function and exact position in the wreck. It involves transport of the lifted identified parts and treatment for storage on shore. During conservation the necessary laboratory with water tanks, crane systems and other infrastructure for the treatment will be needed. This includes large size freeze drying equipment, PEG (Polyethylene glycol) storage and treatment tanks, disposal facilities for used chemicals, laboratories and offices, etc. The potential post-conservation problems related to sulphur and iron contaminants must also be considered.

The conservation laboratory and offices will need to remain operational for at least 15 years and house a full-time conservation team of at least 5 technicians and a management board comprising skilled chemists and other specialists with expertise relevant to the project. This approach needs the removal of explosives prior to the start of the operations. There has to be a full commitment about the final destination of the wreck, a requirement of the UNESCO Convention on historic wrecks.

One reason to justify such a huge undertaking would be the creation of a Maritime Archaeology and Conservation research unit, ideally within a university framework. In this way valuable knowledge and experience in conservation techniques can be developed using a wreck with an interesting history.

To respect the UNESCO Convention there has to be a detailed plan with a clear end use outlined and with the infrastructure and funding ascertained, before the project can start.
The experts agreed that this approach would entail expenditure completely out of proportion to the possible return. The history of the ship and the construction methods are well documented, its polar history being rather short. There are numerous remains which could serve as symbols of Belgian research in Antarctica. Unlike on board the Vasa and the Mary Rose, it is very unlikely that more artefacts linked to the polar history of the ship could be found in the wreck.

It was also mentioned that there are far more interesting ships to be salvaged and that there are enough shipwrecks both in existing exhibits and in storage.

**In-situ preservation**

The experts also considered the in-situ preservation of the Belgica as the centrepiece in an observation and scientific monitoring site. Such a site would include the lighter which sank together with the Belgica a short distance to the south.

Measurements on the rate and mechanisms of deterioration of the wood, the comparative evolution of the wooden structure of the Belgica and the metallic components of the lighter can provide valuable information for other marine artefacts. Such data must of course be coupled to the site specifics such as the physico-chemistry of the local seawater, the nature of the underlying bedrock and sediments and the local aquatic life. Monitoring the explosives still on board both wrecks could provide welcome information on the biodegradation and biochemical attenuation processes, data which can be useful for risk assessment of the widespread amount of ammunition still on ocean floors worldwide.

The experts agreed to elaborate this recommendation and to analyse the possibilities to guarantee the safety of the site and to monitor it with a minimum of disturbance. To avoid further damage and pilfering, a warning system could be installed in collaboration with the local authorities. The heavy winch installed on the superstructure, which is a later addition to the ship should be removed to avoid further damage due to the weight. It was also recommended to remove the capstan. Structurally it would be worth considering lateral support of the wreck.

The prevailing idea was that this approach was a realistic one in which the collaboration of local high schools, the local diving club and probably Tromsø University might be interested in.

The experts indicated their willingness to further advise such a programme and eventually to participate in it. It was also clear that the findings of the monitoring could be of value to other conservation problems and probably on the handling of explosives in other underwater burial sites.

Finally it was agreed upon to continue with the elaboration of this approach, including the legal and administrative requirements.
4 Final recommendations

The five experts unanimously agreed to recommend the in-situ preservation of the Belgica as the centrepiece of a scientific observation and monitoring site. This would preferably include the conservation of the lighter in the immediate neighbourhood.

Some minor measures to extend the life of the wreck are recommended as well as the temporary suspension of destructive testing.

The experts further agreed that if and where applicable, the Unesco Convention on the protection of Underwater Cultural Heritage should be strictly respected.

The experts indicated their willingness to collaborate to further elaborate this proposal.

As an observatory the Belgica could once more serve as an international platform for science and the wreck could become an underwater memorial.

November 18, 2009

Mr. Charles Barker

Dr. Inger Marie Egenberg

Dr. Yvonne Fors

Dr. Ian MacLeod

Dr. Kristiane Straetkvern